

FCC PART 95
MEASUREMENT AND TEST REPORT

For

BULK UNLIMITED CORP

199 LEE AVENUE SUITE 464, BROOKLYN, NY 11211 - USA

FCC ID: 2AE67-0563

Report Type: Original Report	Product Type: 1 Mile Walkie Talkie
Test Engineer: <u>Gavin Xu</u> <i>Gavin Xu</i>	
Report Number: <u>RDG160628003-00</u>	
Report Date: <u>2016-07-13</u>	
Reviewed By:	<u>Dean Liu</u> <i>Dean Liu</i> RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY	3
TEST FACILITY	3
SYSTEM TEST CONFIGURATION.....	4
DESCRIPTION OF TEST CONFIGURATION	4
EQUIPMENT MODIFICATIONS	4
BLOCK DIAGRAM OF TEST SETUP	4
SUMMARY OF TEST RESULTS	5
FCC §2.1093 - RF EXPOSURE INFORMATION	6
APPLICABLE STANDARD	6
TEST RESULT	6
FCC §2.1046, §95.639(a) & §95.639(d) - RF OUTPUT POWER	7
APPLICABLE STANDARD	7
TEST PROCEDURE	7
TEST EQUIPMENT LIST AND DETAILS.....	7
TEST DATA	8
FCC §2.1047 & §95.637(a) - MODULATION CHARACTERISTIC	9
APPLICABLE STANDARD	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
TEST DATA	9
FCC §2.1049 & §95.633(a) (c) - AUTHOURIZED BANDWIDTH AND EMISSION MASK.....	13
APPLICABLE STANDARD	13
TEST PROCEDURE	13
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST DATA	14
FCC §2.1053 & §95.635(b) (7) - RADIATED SPURIOUS EMISSION	16
APPLICABLE STANDARD	16
TEST PROCEDURE	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST DATA	17
FCC§2.1055 (d), §95.626(b) & §95.621 - FREQUENCY STABILITY	18
APPLICABLE STANDARD	18
TEST PROCEDURE	18
TEST EQUIPMENT LIST AND DETAILS.....	18
TEST DATA	19

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *BULK UNLIMITED CORP* 's product, model number: 0563 (FCC ID: 2AE67-0563) or the "EUT" in this report was a *1 Mile Walkie Talkie* , which was measured approximately:13.5 cm (L) x 5cm (W) x 3.2 cm (H), rated input voltage: DC 4.5 V.

** All measurement and test data in this report was gathered from production sample serial number: 160628003 (Assigned by BACL,Dongguan). The EUT supplied by the applicant was received on 2016-06-30.*

Objective

This report is prepared on behalf of *BULK UNLIMITED CORP* in accordance with Part 2 and Part 95, Subpart A & Subpart B & Subpart E of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart A, B and Subpart E of the Federal Communication Commissions rules with TIA-603-D, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

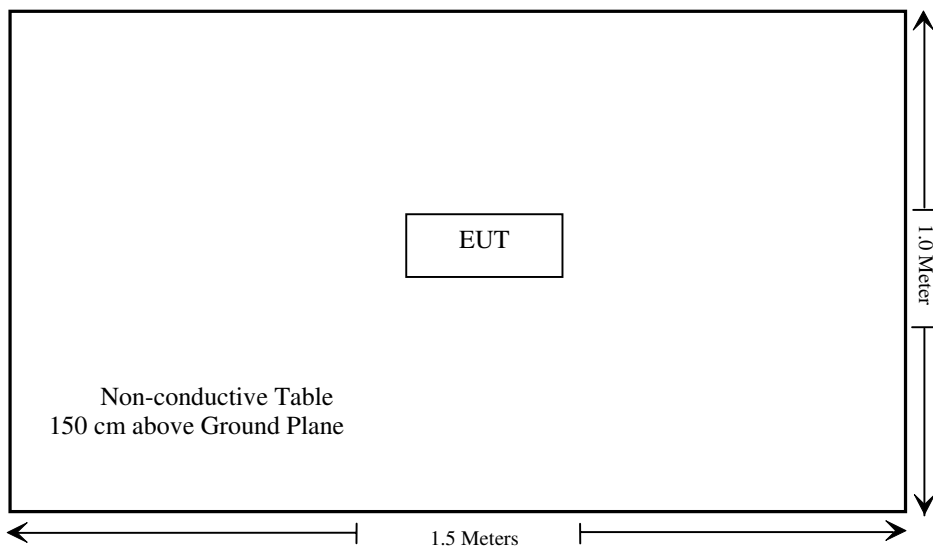
Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modification was made to the EUT tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§2.1046, §95.639(a), §95.639(d)	RF Output Power	Compliance
§2.1047, §95.637(a)	Modulation Characteristic	Compliance
§2.1049, §95.633(a) (c)	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.635(b) (7)	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.626(b), §95.621	Frequency Stability	Compliance

FCC §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Test Result

Please refer to SAR Report Number: RDG160628003-20.

FCC §2.1046, §95.639(a) & §95.639(d) - RF OUTPUT POWER**Applicable Standard**

Per FCC §2.1046, §95.639(a) and §95.639(d), No FRS Unit, under any condition of modulation, shall exceed a 0.5 W effective radiated power (ERP).

Per FCC §95.639 (a) (1), No GMRS transmitter, under any condition of modulation, shall exceed 50 W Carrier power when transmitting emission type A1D, F1D, G1D, A3E, F3E or G3E.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the emissions were measured by the substitution.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Agilent	Signal Generator	E8247C	MY43321350	2014-10-16	2016-10-15
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
Mini-Circuits	HIGH PASS FILTER	BHP-550+	YZU15801121	2016-05-06	2017-05-06
Weinschel Corp	Terminal Load(100W)	1440-3	MD447	/	/

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Gavin Xu on 2016-07-06

Test Mode: Transmitting

Conducted Output Power:

Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (W)
FRS	1	462.5625	24.52	0.283
FRS	2	462.5875	24.37	0.274
FRS	3	462.6125	24.28	0.268

Note: The rated output power: 25.0 dBm

ERP:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
frequency:					462.5875	MHz		
462.5875	H	82.71	1.4	0.0	0.7	0.7	27.0	26.3
462.5875	V	100.06	21.7	0.0	0.7	21.0	27.0	6.0

Test Result: Compliance.

FCC §2.1047 & §95.637(a) - MODULATION CHARACTERISTIC

Applicable Standard

Per FCC §2.1047 and §95.637(a): A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A FRS unit that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 2.5 kHz, and the audio frequency response must not exceed 3.125 kHz .

Each GMRS transmitter, except a mobile station transmitter with a power output of 2.5 W or less, must automatically prevent a greater than normal audio level from causing over-modulation. The transmitter also must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of § 95.631 (without filtering.) The filter must be between the modulation limiter and the modulated stage of the transmitter. At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least $60 \log_{10} (f/3)$ dB greater than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB greater than the attenuation at 1 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	RF Communications Test Set	8920A	00 235	2015-07-18	2016-07-17
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Test Method: TIA/EIA-603-D

Test Data

Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	46 %
ATM Pressure:	100.3 kPa

The testing was performed by Gavin Xu on 2016-07-06.

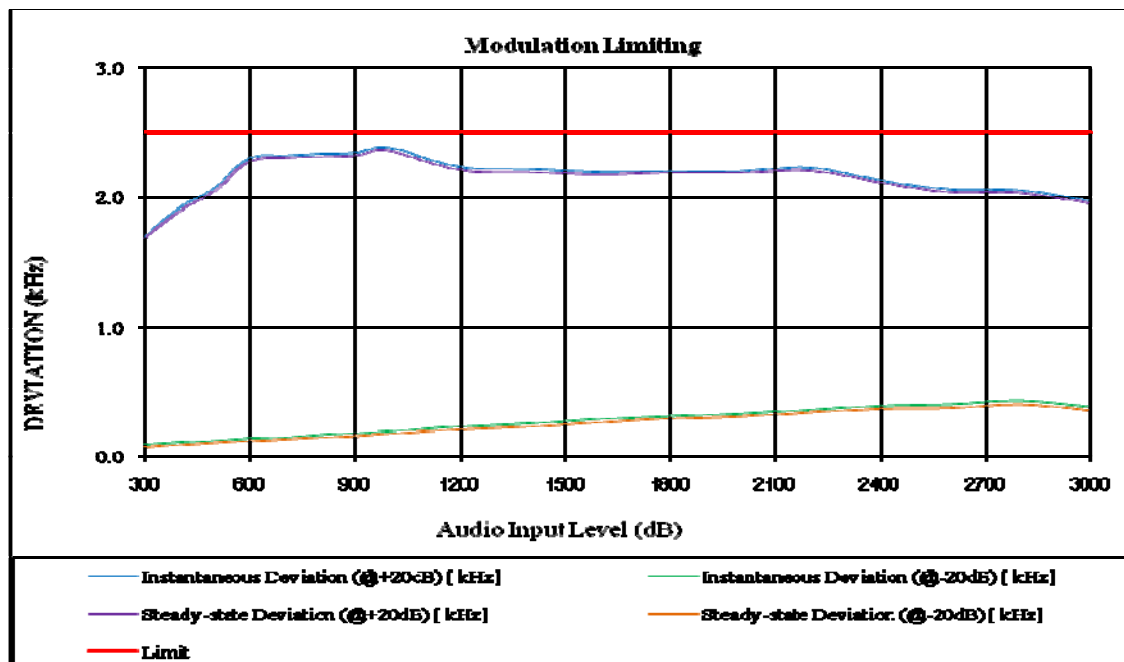
Please refer to the following tables and plots.

Test Mode: Transmitting

MODULATION LIMITING

FRS (462.5875 MHz)

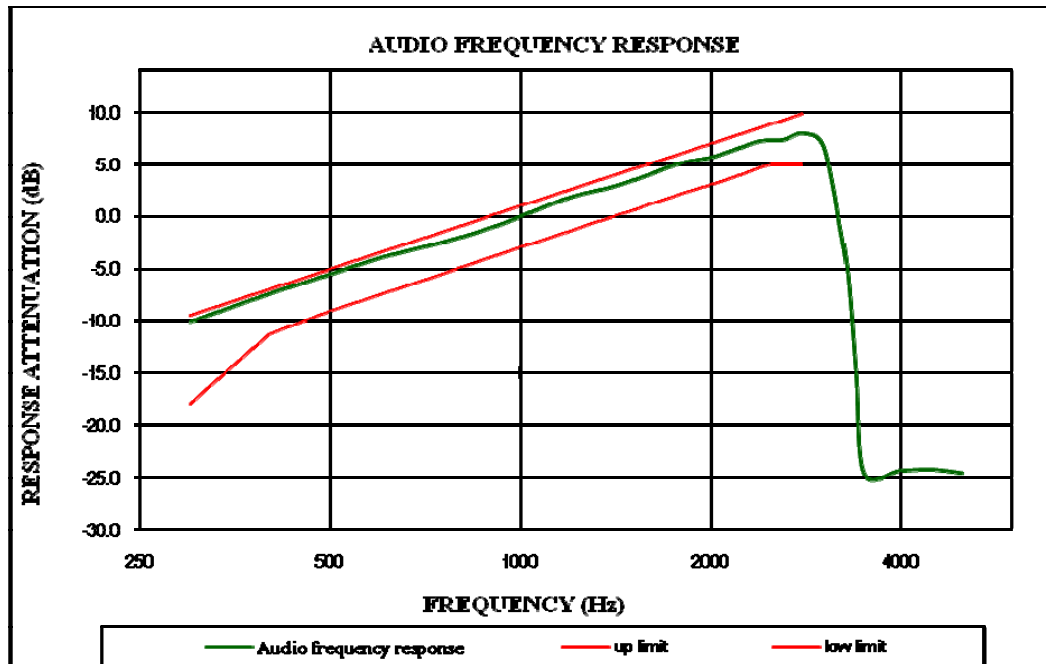
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	1.693	0.094	1.679	0.076	2.5
400	1.924	0.109	1.893	0.096	2.5
500	2.068	0.122	2.047	0.111	2.5
600	2.298	0.140	2.274	0.126	2.5
700	2.318	0.148	2.303	0.138	2.5
800	2.331	0.168	2.313	0.151	2.5
900	2.337	0.181	2.321	0.164	2.5
1000	2.374	0.196	2.352	0.182	2.5
1200	2.232	0.234	2.209	0.216	2.5
1400	2.214	0.257	2.191	0.236	2.5
1600	2.195	0.292	2.173	0.271	2.5
1800	2.197	0.314	2.187	0.301	2.5
2000	2.198	0.335	2.188	0.317	2.5
2200	2.227	0.364	2.203	0.349	2.5
2400	2.129	0.396	2.113	0.377	2.5
2600	2.061	0.407	2.037	0.382	2.5
2800	2.053	0.430	2.031	0.411	2.5
3000	1.977	0.391	1.957	0.367	2.5



Audio Frequency Response

FRS (462.5875 MHz)

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.04
400	-7.36
500	-5.48
600	-3.95
700	-2.93
800	-2.01
900	-1.03
1000	0.00
1200	1.84
1400	2.84
1600	4.02
1800	5.18
2000	5.69
2200	6.52
2400	7.28
2600	7.38
2800	8.04
3000	7.08
3125	2.93
3200	-0.72
3300	-5.60
3400	-15.12
3500	-24.60
4000	-24.35
4500	-24.24
5000	-24.57



FCC §2.1049 & §95.633(a) (c) - AUTHORIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.633(c), the authorized bandwidth for emission type F3E or F2D transmitted by a FRS unit is 12.5 kHz. The authorized bandwidth for emission type F1D, G1D, F3E or G3E is 20kHz.

The power of each unwanted emission shall be less than TP as specified in the applicable paragraphs listed in the following :

- 1) At least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- 2) At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- 3) At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Test Procedure

TIA-603-D, section 2.2.11

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	RF Communications Test Set	8920A	00 235	2016-07-18	2017-07-17
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06
R&S	Spectrum Analyzer	FSEM	DE31388	2016-05-09	2017-05-09
Weinschel Corp	Attenuator(20dB)	53-20-34	LN749	2016-05-08	2017-05-08

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

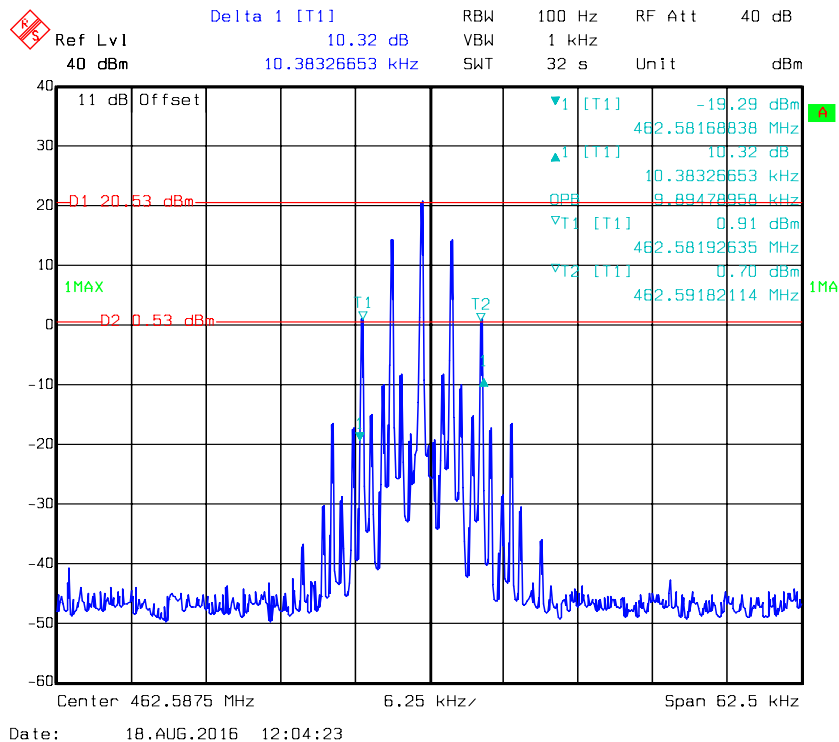
Test Data**Environmental Conditions**

Temperature:	29.1 °C
Relative Humidity:	87 %
ATM Pressure:	99.7 kPa

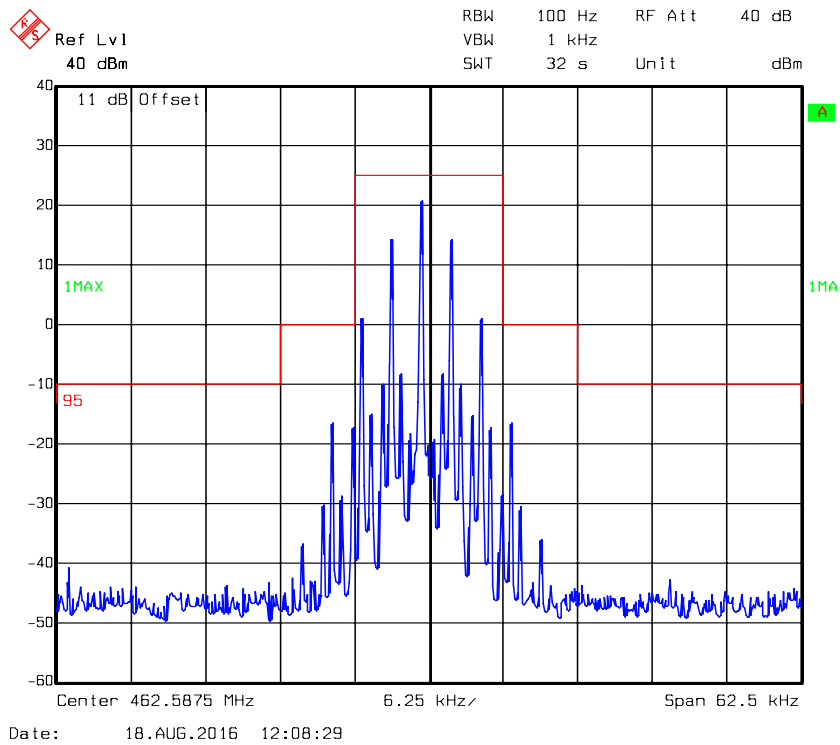
The testing was performed by Gavin Xu on 2016-08-18.

Test Mode: Transmitting

Modulation Mode	f_c	99% Occupied Bandwidth	20 dB Bandwidth
	MHz	kHz	kHz
FM	462.5875	9.89	10.38

FRS (462.5875 MHz)

EMISSION MASK



FCC §2.1053 & §95.635(b) (7) - RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.635

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level
Spurious attenuation limit in dB = 43+10 Log₁₀ (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
ETS-Lindgren	Horn Antenna	3115	9808-5557	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	29.1 °C
Relative Humidity:	57 %
ATM Pressure:	99.7 kPa

The testing was performed by Gavin Xu on 2016-07-06.

Test Mode: Transmitting

FRS (462.5875MHz)

Below 1 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
frequency:					462.5875	MHz		
925.176	H	38.10	-35.6	0.0	1	-36.6	-13.0	23.6
925.176	V	36.74	-33.7	0.0	1	-34.7	-13.0	21.7

Above 1 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
frequency:					462.5875	MHz		
1387.763	H	57.53	-43.1	8.9	1.5	-35.7	-13.0	22.7
1387.763	V	62.70	-37.6	8.9	1.5	-30.2	-13.0	17.2
1850.350	H	48.39	-51.3	11.4	1.4	-41.3	-13.0	28.3
1850.350	V	50.04	-49.6	11.4	1.4	-39.6	-13.0	26.6
2312.938	H	40.52	-55.8	11.4	2.4	-46.8	-13.0	33.8
2312.938	V	41.77	-54	11.4	2.4	-45.0	-13.0	32.0
2775.525	H	41.92	-56	13.1	2.3	-45.2	-13.0	32.2
2775.525	V	37.08	-61.3	13.1	2.3	-50.5	-13.0	37.5
3238.113	H	47.04	-50.4	13.6	2.2	-39.0	-13.0	26.0
3238.113	V	42.85	-53.9	13.6	2.2	-42.5	-13.0	29.5
3700.700	H	41.74	-53	14.0	2.4	-41.4	-13.0	28.4
3700.700	V	39.14	-55.2	14.0	2.4	-43.6	-13.0	30.6

FCC§2.1055 (d), §95.626(b) & §95.621 - FREQUENCY STABILITY**Applicable Standard**

According to FCC §2.1055(a) (1), the frequency stability shall be measured with variation of ambient temperature from –30 °C to +50 °C, and according to FCC 2.1055(d) (2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.626(b), Each FRS Unit must be maintained within a frequency tolerance of 0.00025 % (2.5 ppm).

According to FCC §95.621, Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005 % (5 ppm).

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Frequency Counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Frequency Counter.

Frequency Stability vs. Voltage:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

The output frequency was recorded for each voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2015-09-10	2016-09-09
UNI-T	Multimeter	UT39A	M130199938	2016-04-02	2017-04-02
Pasternack	RF Coaxial Cable	RF-01	/	2016-05-06	2017-05-06

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

Temperature:	29.1℃
Relative Humidity:	57%
ATM Pressure:	99.7 kPa

The testing was performed by Gavin Xu on 2016-07-06.

Test Mode: Transmitting

Reference Frequency: 462.5875 MHz				
Temperature	Voltage	Reading	Frequency Error	Limit
℃	Vdc	MHz	ppm	ppm
-30	4.5	462.587489	-0.02	2.5
-20		462.587476	-0.05	
-10		462.587478	-0.05	
0		462.587482	-0.04	
10		462.587473	-0.06	
20		462.587481	-0.04	
30		462.587475	-0.05	
40		462.587483	-0.04	
50		462.587482	-0.04	
25	4.05	462.587483	-0.04	

Note: The extreme low voltage was declared by applicant.

***** END OF REPORT *****